

We claim:

1. An inking system for a printing system including a plate cylinder carrying at least one printing plate comprising:
  - a form roller rotationally contacting the printing plate and for applying ink to the printing plate;
  - 5 a secondary roller rotationally contacting the printing plate wherein the diameter of the secondary roller is substantially smaller than the diameter of the form roller;
  - an applicator roller rotationally contacting the form roller for applying ink to the form roller; and
- 10 an ink subtractive system including at least one roller rotationally contacting the form roller for removing ink from the form roller.
2. The inking system of claim 1 wherein the secondary roller is a clean-up roller that removes residual ink from non-image areas of the printing plate after ink has been applied to the printing plate by the form roller.
- 15 3. The inking system of claim 2 wherein the clean-up roller is friction driven at the speed of the printing system.
4. The inking system of claim 2 wherein the clean-up roller is driven by a variable speed drive.
- 20 5. The inking system of claim 2 further comprising a vibrator roller and wherein the clean-up roller rotationally contacts the vibrator roller and the vibrator roller rotationally contacts the form roller.

6. The inking system of claim 2 wherein the form roller and the clean-up roller have resilient coverings.

7. The inking system of claim 2 wherein the form roller is approximately, but not exactly, the same diameter as the plate cylinder.

5 8. The inking system of claim 7 wherein the diameter of the clean-up roller is less than half the diameter of the form roller.

9. The inking system of claim 7 wherein  
the plate cylinder and the form roller are rotated at about the same rpm so  
that the same areas on the form roller contact the same areas on the printing plate  
10 during each revolution of the plate cylinder; and  
the plate cylinder and the form roller have slightly different diameters such  
that their surface speeds at a nip formed between the plate cylinder and the form  
roller differ by greater than one foot per minute.

10. The inking system of claim 9 wherein the difference in surface  
15 speeds at the nip formed between the plate cylinder and the form roller is between  
four and ten feet per minute.

11. The inking system of claim 1 wherein the ink subtractive system  
comprises:  
20 a resilient-surfaced transfer roller rotationally contacting the form roller for  
removing excess ink from the form roller;

1. a hard surfaced subtractive roller driven by a variable speed drive, which subtractive roller rotationally contacts the transfer roller for removing excess ink from the transfer roller; and

5. a scraper blade adjacent the subtractive roller for scraping excess ink from the subtractive roller.

12. The inking system of claim 1 further comprising means for selectively disengaging the form roller and the clean-up roller from the plate cylinder.

10. 13. The inking system of claim 11 wherein the form roller and clean-up roller are normally engaged with the printing plate during printing and wherein the form roller and clean-up roller are selectively disengaged from the printing plate during wash-up.

15. 14. The inking system of claim 2 wherein substantially all of the ink applied to the printing plate is applied by the form roller.

20. 15. The inking system of claim 2 in combination with an offset printing system having a plate cylinder and a blanket cylinder and wherein the clean-up roller removes residual ink from non-image areas of the printing plate before the ink is applied by the printing plate to the blanket cylinder.

16. A method of inking one or more printing plates on a rotating plate cylinder comprising:

20. applying a film of ink to a form roller with an applicator roller:

transferring ink to a rotating printing plate at a nip between the form roller and printing plate;

removing residual ink from non-image areas of the printing plate with a clean-up roller at a nip between the clean-up roller and the printing plate;

5 and

removing excess ink from the form roller at a nip between the form roller and a subtractive roller system.

17. The method of inking of claim 16 further comprising the step of positioning a vibrating roller to form a first nip with the clean-up roller and a 10 second nip with the form roller.

18. The method of inking of claim 16 wherein the form roller and plate cylinder are driven at surface speeds which differ by more than one foot per minute.

15 19. The method of inking of claim 16 wherein the clean-up roller and plate cylinder are driven at surface speeds which differ by more than one foot per minute.

20. The method of claim 16 further comprising disengaging the form roller and clean-up roller from the plate cylinder for wash-up operation.

20 21. The method of claim 20 further comprising:  
applying wash-up roller solution to the application roller;  
rotating the applicator roller, form roller, clean-up roller, and subtractive roller; and

removing a mixture of ink and clean-up solution from the subtractive roller.

22. An inking system comprising:

a form roller for applying ink to a printing plate;

5 an applicator roller rotationally contacting the form roller for applying ink to the form roller;

a wiper blade forming at least a portion of an ink reservoir, the wiper blade contacting a cylindrical surface of the applicator roller to meter an ink film on the applicator roller, the wiper blade being inclined downwardly at an 10 acute angle with respect to a tangent to the cylindrical surface of the applicator roller at a line of contact between the wiper blade and the cylindrical surface of the applicator roller; and

a baffle located above the line of contract between the wiper blade and applicator roller for maintaining a volume of ink against the applicator roller.

15 23. The inking system of claim 22 further comprising means for varying a vertical location of the baffle to provide sufficient ink contact with the applicator roller.

20 24. The inking system of claim 22 wherein the cylindrical surface of the applicator roller rotates generally downwardly at the line of contact between the wiper blade and the applicator roller creating a rotating cylindrical volume of ink held in place by the baffle.

25. The inking system of claim 22 further comprising a subtractive roller system including a subtractive roller and a blade in contact therewith for

removing ink from the subtractive roller and depositing the removed ink in the ink reservoir.